of a wire, heated to dull redness in the circuit, is cooled by ice, the remaining portion becomes white hot, whilst the application of the flame of a spirit-lamp renders the other part colder.

In discussing the relations of heat, magnetism, and chemical action, to electricity, Sir Humphry particularly adverts to the relative elevations of temperature which the different metals undergo during the transmission of electricity: thus, when a chain, composed of alternate lengths of silver and platinum is made the connecting medium between the poles of a powerful battery, the silver wire being four or five times the diameter of the platinum, the former metal is not sensibly heated, whilst the latter becomes intensely ignited. Now if heat be regarded as *material*, we cannot suppose that it is expelled from the platinum because it may be thus generated indefinitely; again, if dependent upon, or identical with, electricity, its quantity should be similar throughout the metallic chain. In regard to the magnetism of this chain, the case is different, for every part of it exhibits equal magnetic powers; so that the power appears directly as the quantity of electricity.

Sir Humphry Davy concludes this communication with some general remarks respecting the different phenomena produced by the agency of electricity; whether they depend upon one or more species of ethereal matter, or whether they are merely exhibitions of the attractive powers and subtile motions of the corpuscles of common matter, are questions which remain for the determination of future researches and experiments.

The Bakerian Lecture. An Account of Experiments to determine the Amount of the Dip of the Magnetic Needle in London, in August 1821*; with Remarks on the Instruments which are usually employed in such Determinations. By Captain* Edward Sabine, *of the Royal Regiment of Artillery, F.R.S.* Read November 22, 1821. [*Phil. Trans.* 1822, *p.* 1.]

After describing the imperfections of the instruments in general use for ascertaining the dip of the magnetic needle, and adverting to the consequent inaccuracy and insufficiency of the observations made with them, Captain Sabine gives an account of the form of dipping-needle which he preferred for his experiments, and which was constructed for him by Mr. Dollond, upon principles laid down by Professor Meyer, of Gottingen. He then enters into minute details of the mode of pursuing and verifying his observations, the results of which, gained by three different methods, are as follows: viz. by 10 experiments with Meyer's needle, 70° 2′·9; by the times of oscillation in the magnetic meridian, and in the plane perpendicular to it (mean by three needles), 70° 04′; by the times of vertical and horizontal oscillation, 7° 02′·6. So that 70° 03′ may be considered as the mean dip of the needle towards the north, in August and September 1821, within four hours of noon, being the limit within which all the experiments were made.

Alluding to former observations for the purpose of determining the dip in London, the author observes that, independent of any imperfection in the instruments, they were made in houses in close built parts of the metropolis, and, therefore, all subject to the influence of local attraction; and, moreover, that the correction found by observing the difference of the dip on the outside of the house cannot be regarded as an effectual remedy, inasmuch as the needle may still have been attracted by iron in the adjoining houses, or in the neighbourhood. It is, indeed, only requisite to try needles in different situations in a city, to be convinced how little dependence should be placed in the accuracy of such results: the author thinks that it is rather owing to this cause than to instrumental error, that the dip at the Apartments of the Royal Society is stated in the Philosophical Transactions for the present year to be 71° 06′. To avoid this source of error, Captain Sabine conducted the observations which form the subject of this lecture in the nursery-ground in the Regent's Park, a situation which he regards in all respects eligible, and far removed from the influence of iron.

Some Positions respecting the Influence of the Voltaic Battery in obviating the Effects of the Division of the Eighth Pair of Nerves. Drawn up by A. P. Wilson Philip, *M.D. F.R.S. Edinb. Communicated by* B. C. Brodie, *Esq. F.R.S.* Read July 5, 1821. [*Phil. Trans.* 1822, *p.* 22.]

The positions established by Dr. Philip, to the satisfaction of Mr. Brodie, are detailed in this paper in the following order.

First. When the nerves are divided and the ends not displaced, if the animal live some hours, food swallowed *before* the operation is *much* digested; but if the ends of the nerves be turned from each other, no *perfectly digested* food is, under the same circumstances, found in the stomach, nor does digestion go on though the animal live; but galvanism applied to the nerves occasions a degree of digestion in the food contained in the stomach, and when galvanized the animal does not suffer from dyspnœa. When the nerves are simply divided, and the animal lives for six hours, the lungs become congested; but they appear healthy when galvanism has before been sent through the lower portion of the divided nerves.

On some Alvine Concretions found in the Colon of a young Man in Lancashire, after Death. By J. G. Children, *Esq. F.R.S. &c. &c. Communicated by the Society for Promoting Animal Chemistry.* Read December 13, 1821. [*Phil. Trans.* 1822, *p.* 24.]

After detailing the above, and adverting to two other cases of intestinal concretions, Mr. Children describes the appearance and composition of the calculi. The nucleus of each was a plumstone enveloped in a compact coating of phosphate of lime and ammoniaco-magnesian phosphate, and of a fibrous substance alternating in lay-